

REMARKS

Claims 1 through 9 are currently pending in the application.

This communication is in response to the Office Action of April 28, 2003.

Claims 1 through 3 and 6 through 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Watts, Jr. et al. (U.S. Patent 6,276,589).

Claims 4 and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Watts, Jr. et al. (U.S. Patent 6,276,589) as applied to claim 3 above, and further in view of Nakasu et al. (U.S. Patent 6,213,356).

Reconsideration of the above-referenced application is respectfully requested.

35 U.S.C. § 103(a) Rejections

(A) Applicable Authority

Applicant submits that the basic requirements of a *prima facie* case of obviousness are summarized in MPEP §2143 through §2143.03, *i.e.*, in order “to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success in combining the references. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the expectation of success must both be found in the prior art, and not based on Applicants' disclosure.” *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Further, in establishing a *prima facie* case of obviousness the initial burden is placed on the examiner. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). See also MPEP § 706.02(j) and § 2142.

(B) 35 U.S.C. § 103 Rejections in view of Watts

Claims 1 through 3 and 6 through 9 were rejected under 35 U.S.C. § 103 as being unpatentable over Watts. Applicants respectfully submit that Watts does not make obvious the invention recited in the independent claim 1 of the above-referenced application. Watts fails to teach each and every limitation of independent claim 1 to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed invention.

Watts teaches or suggests a jet soldering system including a solder ejector 12 for providing a continuous stream of charged solder droplets 14, deflecting plates 16, 18 for passing the charged solder droplets through to a gutter 20 or deflecting the droplets towards a substrate and an x-y translation table on which the substrate is mounted (Fig. 1, col. 3, lines 43-48 and col. 4, lines 17-21). The ejector 12 includes heaters 32, 34 to melt solder in a cartridge 77 contained therein, a gas pressure line 44 for pressurizing the molten solder and a piezoelectric vibrator 31 to produce a standing wave in the stream of solder leaving the ejector (col. 3, line 54 - col. 4, line 5).

Regarding independent claim 1 of the present application, Applicant respectfully submits that there is no suggestion or motivation in the cited reference or from the knowledge generally available in the prior art which would lead one of ordinary skill in the art to modify Watts as suggested in the Office Action to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 with respect to the presently claimed invention. Watts fails to teach or suggest the limitations set forth in claim 1 calling for “selectively directing said stream of liquid solder metal droplets in a first dimension and a second dimension” and “deflecting said electrically charged stream of liquid solder metal droplets in said first dimension and said second dimension”. It was asserted in the Office Action that one of ordinary skill in the art would have been motivated to add two more deflection plates that are perpendicular to the x-axis, to allow one to deflect the solder droplets in the X direction as well. The Office Action asserts that this is merely a duplication of parts, citing *In re Harza* 274, F.2d 669, 124 USPQ378 (CCPA 1960). Applicants respectfully submit that the present conflict is distinguishable from *In re Harza*.

The claims at issue in *Harza* were directed to a plurality of ribs on a web to form a seal in a joint with prior art disclosing a single rib on a web to form a seal in a joint. No modification

to the “ribs” was required, only additional “ribs” were added. The Office has asserted in the outstanding Office Action that through a duplication of the pair of deflection plates of Watts, a stream of drops would be deflected in a first and a second dimension. The applicants respectfully submit that a duplication of parts would merely provide additional plates arranged on the Y-axis providing deflection in the Y direction, not additional plates, rearranged to the X-axis. Further, “The mere fact that a worker in the art could rearrange the parts of the reference device to meet the terms of the claims on appeal is not by itself sufficient to support a finding of obviousness. *The prior art must provide a motivation or reason* for the worker in the art, without the benefit of applicants specification, to make the necessary changes in the reference device.” *Ex parte Chicago Rawhide Mfg. Co.*, 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984) (emphasis added).

Additionally, the prior art supplies no motivation or reason to eliminate substrate movement. With a substrate moveable along the x-axis, there is no reason for directing droplets in both a first and a second dimension. With impermissible hindsight, the concept of lighter objects requiring less energy to move than heavier objects is well within the scope of knowledge of a graduate engineer. However, if the Watts reference is viewed as a whole without the benefit of improper hindsight, there is clearly no motivation modify the reference to either eliminate substrate movement, or include multiple pairs of deflecting plates.

Therefore, it is respectfully submitted that claim 1 is allowable over Watts because the cited prior art fails to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 because the cited prior art does not teach or suggest the claim limitations of the claimed invention of claim 1. Further, there is no objective reason in the Watts reference for any modification thereof.

Claims 2 through 3 and 6 through 9 are each allowable, among other reasons, as depending from claim 1, which is allowable.

Claim 8 recites a blanking step comprising deflecting a stream of liquid solder metal droplets and catching said deflected stream of liquid solder metal droplets to prevent the drops from being deposited on the substrate. Watts does not teach or suggest deflecting a stream of liquid solder metal droplets to prevent them from being deposited on the substrate. Rather, Watts teaches catching undeflected drops in a gutter to prevent the drops from being deposited on the

substrate. The position set forth on page 4 of the Office Action is that these methods are functionally equivalent to each other. According to the MPEP, 2144.06, "In order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicants disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958)"

Applicant respectfully submits that the equivalence of deflecting a stream of liquid solder metal droplets and catching undeflected drops in a gutter is not recognized in the prior art. Therefore, Applicant submits that claim 8 is additionally allowable since Watts fails to teach each and every element of claim 8 and cannot and does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the presently claimed invention.

Therefore, for the reasons just explained, Applicant respectfully submits that Watts does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 of claims 1 through 3 and 6 through 9. Therefore, such claims are allowable.

(C) Rejections under 35 U.S.C. § 103 of Watts combined with Nakasu.

Claims 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Watts as applied to claim 3 above, and further in view of Nakasu.

Nakasu discloses a bump forming apparatus that comprises a first tank 3 storing fused solder 1 having an outlet 2 for the fused solder 1 on its bottom surface, a pipe 4 having one end connected with the outlet 2, a cavity 6, arranged below the first tank 3, having an inlet 5 for the fused solder 1 connected with another end of the pipe 4, a nozzle 8, arranged on a lower portion of the cavity 6, having a first opening 7 on its bottom surface, a pressure element formed by a diaphragm 9 arranged on an upper portion of the cavity 6 and a piezoelectric element 10 fixed to an upper surface of the diaphragm 9 for properly pressurizing the fused solder 1 in the cavity 6 toward the first opening 7 by external voltage application thereby dropping the fused solder 1 from the first opening 7 (Nakasu, col. 7, lines 36-54). In use, voltage is externally applied to the piezoelectric element 10 for expanding the piezoelectric element 10 thereby displacing the diaphragm 9 toward the first opening 7 and dropping the fused solder 1 from the first opening 7

by the pressure. When the fused solder 1 is dropped from the first opening 7, the surface level of the fused solder 1 in the first tank 3 so lowers that the fused solder 1 loses contact with the level detector 16. Then, the level control part 17 detects this and drives the second heater 15 for supplementing the fused solder 1 in the first tank 3. Thus, the surface level of the fused solder 1 in the first tank 3 is kept at a constant level.

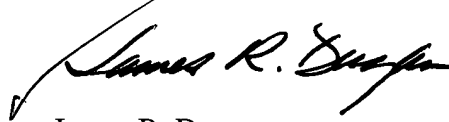
Applicant respectfully submits that any combination of Watts and Nakasu do not support a finding of *prima facie* obviousness under 35 U.S.C. § 103 regarding the inventions of claims 4 and 5. Claims 4 and 5 are dependent from claim 3, which in turn is dependent from claim 1. Thus claims 4 and 5 include by dependency all of the limitations of claims 3 and 1. As explained hereinabove, Watts does not recited in claim 1. Nakasu does not add any teaching or suggestion which would overcome the deficiencies of Watts in regard to the claim 1 limitations of “selectively directing said stream of liquid solder metal droplets in a first dimension and a second dimension” and “deflecting said electrically charged stream of liquid solder metal droplets in said first dimension and said second dimension.” Therefore, the combination of Watts and Nakasu does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the invention recited in claim 1. Claims 4 and 5 are therefore allowable, at least in part, for their dependency from claim 1. Applicant respectfully requests the allowance of claims 4 and 5 under 35 U.S.C. §103.

CONCLUSION

For the reasons set forth hereinabove, Applicant submits that claims 1 through 9 are clearly allowable over the cited prior art.

Applicant requests the allowance of claims 1 through 9 and the case passed for issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "James R. Duzan", with a stylized flourish at the end.

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